

**Bonneville Power Administration  
Fish and Wildlife Program FY99 Proposal**

**Section 1. General administrative information**

**Coordinate assessment and prioritization of key  
habitats in the Methow Basin for protection and  
restoration**

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**Bonneville project number, if an ongoing project**     9086

**Business name of agency, institution or organization requesting funding**  
The Pacific Watershed Institute

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**Business acronym (if appropriate)**     PWI

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**Subcontractors.**

<b>Organization</b>	<b>Mailing Address</b>	<b>City, ST Zip</b>	<b>Contact Name</b>
Yakama Indian Nation	P.O. Box 151	Toppenish, WA 98948	Lee Carlson
USFS - Okanogan National Forest	P.O. Box 579	Winthrop, Wa 98862	Jennifer Molesworth
PNW Research Station	3200 SW Jefferson	Corvallis, OR 97331	Bruce McIntosh
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Terra-Logic	8510 Wallingford Ave N.	Seattle, WA 98103	Levon Yengoyan

**NPPC Program Measure Number(s) which this project addresses.**  
2.2A, 3.2, 4.1A, 7.0B.1, 7.1, 7.6, A-E, 7.7A, 7.8A,D, E,-J, 11.2d-E

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**NMFS Biological Opinion Number(s) which this project addresses.**

NMFS recently listed steelhead but there is no Biological Opinion issued yet. Spring Chinook and Bull Trout are to be listed.

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**Other planning document references.**

*Wy Kan Ush Me Wa Kush Wit* 1995. Institutional Recommendations - support and implement sub-basin planning; Technical Recommendations - improve in-channel conditions by improving or eliminating land-use practices that degrade watershed quality; Implement recommendations from the Draft Methow River Basin Plan for water use and conservation; Stop Riparian Degradation.

Integrated System Plan For Salmon & Steelhead Production in the Columbia River Basin. 1991. Inventory Diversions; Implement Screening; inventory and map habitat conditions and improvement measures.

Draft Methow River Basin Plan. Methow Valley Water Pilot Program, Planning Committee. 1994. Initiate water use and water conservation measures; Protect and Restore riparian and aquatic habitat for fish and wildlife.

Multi-objective River Corridor Plan for the Methow Basin, Okanogan County Office of Planning and Development, 1996. Chapter 1. Executive Summary and Recommendations

Methow Valley Ground Water Management Plan. 1994. The Methow Valley Ground Water Advisory Committee. -

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**Subbasin.**

Methow River

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**Short description.**

Use a community based watershed and ecosystem approach to identify key watershed areas for protection and restoration in the Methow River Basin. Develop a priority list of cost-effective protection and restoration activities and coordinate scheduling of projects.

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**Section 2. Key words**

Mark	Programmatic Categories	Mark	Activities	Mark	Project Types
x	Anadromous fish		Construction	+	Watershed
+	Resident fish		O & M		Biodiversity/genetics
+	Wildlife		Production		Population dynamics
	Oceans/estuaries	+	Research	x	Ecosystems
	Climate	+	Monitoring/eval.	+	Flow/survival
	Other		Resource mgmt		Fish disease
		x	Planning/admin.		Supplementation
			Enforcement		Wildlife habitat en-
			Acquisitions		hancement/restoration

**Other keywords.**

Coordination, assessment, prioritization

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**Section 3. Relationships to other Bonneville projects**

<b>Project #</b>	<b>Project title/description</b>	<b>Nature of relationship</b>
5509900	Methow Valley Side Channel	Will provide information for site selection
9603401	Methow Valley Irrigation District	The progress and outcome of this project will help determine actions taken on other irrigation issues in the Methow Basin.

**Section 4. Objectives, tasks and schedules*****Objectives and tasks***

<b>Obj 1,2,3</b>	<b>Objective</b>	<b>Task a,b,c</b>	<b>Task</b>
1	Assess wildlife and anadromous and resident fish habitat in the Methow River basin	a	Identify cooperators (those with interests and knowledge of the watershed)
		b	Develop cooperator team
		c	Convene scoping meetings
		d	Evaluate existing watershed, ecosystem, and habitat assessments, studies and plans
		e	Identify critical information gaps
		f	Identify relationships between past, in-progress, and proposed protection and restoration strategies and projects and proposed projects
2	Identify priority subbasins for protection & restoration projects	a	Establish priority criteria
		b	Identify critical protection and restoration areas on broad scale
		c	Identify subbasin issues, needs
3	Conduct assessments to fill in gaps	a	Historic reconstruction analysis
		b	Geomorphic unit mapping from existing GIS layers and aerial

			photos
		c	Socio-economic links and opportunities
		d	Submit assessments to peer review
4	Establish baseline and Effectiveness Monitoring network	a	Establish groundwater, channel hydraulics, runoff, temperature, sediment/erosion baseline monitoring network
		b	Develop effectiveness monitoring protocol
5	Coordinate in-progress & future protection and restoration projects in the basin	a	Determine restoration schedules, costs, and cooperators
		b	Identify multiple funding sources for project implementation and coordination
		c	Develop strategies to form and run Methow Watershed Council to coordinate projects, including monitoring network

### ***Objective schedules and costs***

<b>Objective #</b>	<b>Start Date mm/yyyy</b>	<b>End Date mm/yyyy</b>	<b>Cost %</b>
1	01/1999	05/1999	15%
2	05/1999	06/1999	10%
3	06/1999	12/2000	40%
4	06/1999	12/2000	20%
5	09/2000	04/2001	5%
			<b>TOTAL 85.00%</b>

### **Schedule constraints.**

#### **Constraints:**

1. The cooperator team is unable to reach agreement on priorities for protection and restoration.
2. If the Watershed Management Council does not get funded, implementation of recommendations and projects may be delayed.
3. Some entities may be unwilling to share information or data. This may create duplication of the information.

#### **Major milestones:**

1. Existing information is organized into an accessible data bank.
2. A strategic plan for coordinating on-going and future projects is developed and locally supported.

3. Coordination activities are transferred to the Watershed Management Council.

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**Completion date.**

2001

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## **Section 5. Budget**

### ***FY99 budget by line item***

<b>Item</b>	<b>Note</b>	<b>FY99</b>
Personnel		338,000
Fringe benefits		46,000
Supplies, materials, non-expendable property		34,000
Operations & maintenance		24,000
Capital acquisitions or improvements (e.g. land, buildings, major equip.)		0
PIT tags	# of tags:	0
Travel		30,000
Indirect costs		71,000
Subcontracts		56,000
Other		
<b>TOTAL</b>		<b>\$599,000</b>

### ***Outyear costs***

<b>Outyear costs</b>	<b>FY2000</b>	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>
Total budget	640,000	50,000		
O&M as % of total	3.75	0		

## **Section 6. Abstract**

The Methow River subbasin is an important stronghold in the Columbia River Basin and retains large, continuous blocks of high quality aquatic habitat that have the ability to support multiple anadromous species. Despite high quality habitat, anadromous fish stocks have substantially decreased due to cumulative impacts. However, opportunity exists to improve adult and juvenile survival and contribute to production increases in the Basin. Improving survival will require a systematic and coordinated approach through a collaborative Methow Valley effort of public and private entities. The project goal is to identify and prioritize key habitat areas and watershed processes for protection and restoration. We propose to develop an integrated protection and restoration strategy for the Methow basin. Objectives include: (1) collect and synthesize existing watershed assessments, plans and other aquatic and terrestrial information and identify gaps; (2) identify key areas for protection and develop restoration priorities; (3) conduct assessments in areas that lack appropriate data; (4) coordinate and schedule future protection and restoration efforts; and (5) establish baseline and effectiveness monitoring network. In the last few years,

PWI has successfully applied the proposed method to watersheds in the upper basin. This method uses reconstruction of watershed functioning through analyzing changes in geomorphic, hydrologic and biological elements. By 2001, the expected outcomes are a basin protection and restoration strategy that identifies: (1) key watersheds for protection, (2) key areas for restoration, (3) restoration project costs and schedules, (4) funding sources; and (5) strategies for developing a Watershed Management Council to coordinate projects.

## **Section 7. Project description**

### **a. Technical and/or scientific background.**

#### **Background.**

The Methow River (Basin area: 1792 mi<sup>2</sup>) is an important tributary to the Columbia River because it retains large, continuous blocks of high quality aquatic, terrestrial and riparian habitat. The basin provides an important stronghold for anadromous and resident fish particularly chinook, steelhead and bull trout. However, populations have been weakened and have decreased substantially (e.g. CRITFC 1995, NWIFC 1992, NPPC 1991, Mullan et al. 1992). There are a number of issues and limiting factors including: increasing demands for developing land and water resources; naturally low summer and winter flows; diminished winter habitat; temperature extremes; loss of spawning and rearing habitat through channel modifications and removal of LWD; passage obstructions; and mortality from ineffective fish screens. Another emerging issue concerns increased summer water temperatures. In the last decade, there have been several recorded cases of water temperatures exceeding 60 degrees( DOE 303d list). However, the cause has not been clearly identified.

The NPPC sponsored a subbasin plan for the Methow and Okanogan Basins (Spotts 1988) which discusses stocks, limiting factors and recommendations for improving productivity through various actions. Other subsequent planning documents concur (e.g. CBFWA 1991, NPPC 1994, CRITFC 1996). These plans recommend that critical areas and priorities for habitat protection and restoration be identified and coordinated among public and private organizations. The purpose of this proposal is to implement this recommendation through a systematic program. The project includes evaluation of overall basin aquatic and terrestrial habitat conditions and ecosystem functioning and developing an integrated strategy for protecting and restoring those areas that are most likely to improve habitat and production in the basin.

Problem statement. A variety of plans, watershed assessments, habitat surveys, and water availability studies have been conducted in the Methow Basin. However, only the watershed assessments conducted by Okanogan National Forest's Methow Valley District (MVRD) (ONF 1994, 1995a, 1995b, 1995c, 1996a, 1996b, 1997, 1998a, 1998b) and a multi-objective river corridor plan developed by Okanogan County (1996) address issues in a watershed context. These agencies cannot provide a mechanism for developing a basin-wide protection and restoration strategy, however. Although the MVRD has actively supports restoration and protection, they are limited by their Forest Management Plans and jurisdictional restraints on designating protection and restoration areas and coordinating projects on lands they do not manage. Much of the land adjacent to the Methow River, and some land along the lower reaches of the Chewuch and Twisp Rivers and the lower reaches of smaller tributaries such as Early Winters Creek, Wolf Creek and Beaver are in private ownership.

The county multi-objective river corridor plan for the Methow Basin (Okanogan County 1996) focuses mostly on flood hazard management issues. The plan recommendations address current and potential problem areas and maintenance needs in relation to flooding issues. One of the more important recommendations in this plan was to consider sensitive geomorphic features such as alluvial fans and steep unstable slopes in the designation of inundation zones for the 100-yr. floodway. These areas also affect riparian and stream conditions. The plan recommends other more general basin wide measures such as restoring the function of riparian areas but does not identify or map critical restoration areas at the project level, specific strategies or priorities. These recommendations have not been implemented or coordinated

with other projects in the basin. Other planning groups in the valley have been more single purpose addressing such issues as water availability (e.g. Methow Valley Water Pilot Planning Project 1994, Methow Valley Groundwater Advisory Committee 1994, EMCON 1993, Golder and Associates 1992, Caldwell, B. and H. Beecher 1992).

In order to develop a successful basin-wide strategy in the Methow Basin that includes community involvement, two elements are required: a local council to coordinate efforts and a non-governmental, scientific organization to conduct the assessments. This is what has prompted us to apply for this proposal. Our project objectives are: (1) collect and synthesize existing watershed assessments and other aquatic and terrestrial information and identify information gaps; (2) identify key areas for protection and develop restoration priorities; (3) conduct assessments in areas that lack appropriate data; (4) establish and implement baseline and effectiveness monitoring network; and (5) coordinate and schedule future protection and restoration efforts. Key areas for protection and restoration will be identified from information in existing assessments and studies. In 1997, citizens in the Methow Valley began the process of forming a Methow Valley Watershed Council. A three year workplan and interim board was formed. They are actively searching for funding to support a coordinator and formally organize the council. Once this happens, the coordination of the protection and restoration strategy will be transferred to a Watershed Management Council formed under chapter 90.82 RCW.

#### Work History in the Basin.

Since 1995, the Pacific Watershed Institute (PWI), a 501 3(c) non profit organization, has been working with the Methow Valley Ranger District (MVRD) on short- and long-term strategies for protecting, restoring and monitoring riparian and aquatic resources and watershed functioning in the Chewuch River (area: 531 mi<sup>2</sup>) and Early Winters Creek (area: 81 mi<sup>2</sup>). These strategies cover approximately 30% of the Methow Basin. The partnership with MVRD and PWI in Chewuch River provided a model for restoration planning and collaboration with other interests in the basin.

Washington State Jobs for the Environment (JFE) and USFS challenge cost-share grants were awarded to PWI to implement the restoration and monitoring strategies in the Chewuch watershed. The Chewuch River was chosen as the first cornerstone in an overall strategy to protect and restore habitat in the Methow River basin. The Chewuch River has been identified as a key watershed under the President's Forest Plan (FEMAT 1994) and PACFISH (USDA, USDI 1994) Strategy.

Through these grants, we implemented riparian and in-stream restoration projects on federal, state and private lands in the Chewuch River watershed. We completed all projects within budget and on time because of the extensive coordination between partners. Twelve miles of stream were restored including the addition of 17 large woody debris structures, stabilization of 2.5 miles of stream bank and re-establishment of 20 - 30 acres of native riparian vegetation. In addition, 10 long-term monitoring sites were also established. The model is being applied to Early Winters Creek.

The Methow Valley subbasin programs, developed and administered by PWI, on the Chewuch River and Early Winters Creek have brought together a unique combination of skill, cooperation, and local commitment. The protection and restoration process for these smaller watersheds maintains key components that can be extrapolated and applied toward the entire Methow basin. The watershed assessment and restoration prioritization process also involves local groups in implementing the recommendations and decisions. One component of the subsequent work is that of employment and retraining. Much of the JFE grant for the Chewuch program has gone towards employing and retraining displaced timber workers and fishermen from the area. The success of this Methow program has prompted several agencies to nominate the program for: (1) U.S. Forest Service watershed cooperation award for the State of Washington for 1997; (2) U.S. Fish and Wildlife Service Key Watershed Focus Program; (3) State of Washington JFE Model Watershed for retraining displaced workers as well as a model for cooperative efforts between local groups and businesses.

#### Relationship to FWP Goals

The restoration and protection strategies pursued by the Pacific Watershed Institute, and supported by the Methow Valley partners, are based on the "Securing the Strongholds" model developed and tested on the Chewuch River by PWI and MVRD (PWI 1996). It is similar to the watershed principles endorsed by the Fish and Wildlife Program (4.1A, 7.6, 7.6A.2, 7.6B.3) and other organizations (Frissell 1993). This model emphasizes habitat protection over restoration through identifying those areas that support continuous blocks of high quality habitat and multiple species. The second element focuses on restoring

those areas that reconnect blocks of high quality habitat, have a higher likelihood of success with minimal long-term maintenance, and are cost-effective. The third phase is restoration of reaches that may not connect blocks of high-quality habitat but are critical to survival. An example of this would be the creation of side-channel habitats for refugia. The restoration projects are designed to be compatible with the watershed-scale hydrologic, geomorphic and channel processes. The projects include in-stream structures and reconstruction of side-channel, riparian and alluvial fan functioning. We use only native plant species in our riparian revegetation projects.

Since one of the major goals of the Fish and Wildlife Program is to increase production (FWP 4.1 pg. 4-4), protecting and restoring high quality habitats in basins such as the Methow Basin is critical to meeting this goal. Efficient and cost-effective actions require collaborative and coordinated efforts.

## **b. Proposal objectives.**

(1) The first step is to collect, synthesize and summarize existing watershed assessments and other studies relating to watershed, aquatic, riparian and terrestrial information in the basin. This information will be used to identify protection and restoration opportunities and understand watershed processes. A scoping process developed by the Pacific Watershed Institute will be used to facilitate the objective. A measurable element of this objective would be a map of specie distribution, critical habitat, type of habitat, and potential condition of habitat based on existing information. Other products are maps and matrices showing the functional relationships between watershed processes and elements, natural disturbances, land management disturbances, and protection and restoration activities. An important outcome of the Scoping process is identification of data and other information gaps and where these are located in relationship to watersheds and habitat.

(2) The cooperator team formed during the scoping process will be responsible for identifying key areas for protection and developing restoration priorities. One outcome will be criteria for rating subbasins for protection and restoration activities. The final product will be a list a subbasins with priority rating, location of critical information gaps in each subbasin, and an assessment schedule and monitoring plan for obtaining information.

(3) Conduct basin-wide inventories to map existing or potential high quality habitats through an assessment process tested by PWI and MVRD in the Chewuch River and Early Winters Creek watersheds (PWI 1996). Products are maps and reports on: (a) distribution of fish species and relation to landform and channel pattern; (b) effect of landforms on stream and riparian morphology and composition; (c) the accumulation and recruitment of LWD and relation to stream morphology and riparian vegetation zones; (d) hydrologic patterns and regimes, particularly the interaction of groundwater and surface water in off channel, side channel and other floodplain areas; (e) groundwater discharge to streams in relation to landforms. All assessment data will be mapped and put into a GIS format for retrieval and query.

(4) The goal of a baseline and effectiveness monitoring network is to design an efficient network that is relevant to developing strategies and evaluating watershed conditions pre and post management actions. A product of this objective is a matrix that details the why, who, what, when, where, how issues of data collection. The final outcome will be a long-term monitoring network that is maintained by Methow Valley organizations such as a Methow Valley Watershed Council.

(5) The final objective of this proposal is to coordinate and schedule future protection and restoration efforts. One product would be an identification and evaluation of the benefits and possible negative effects of restoration activities. For example, certain restoration activities in Early Winters Creek upstream of State Highway 20 bridge could have detrimental impacts on the bridge and private structures. Data obtained from the FEMA floodplain analysis will be used to evaluate the potential impacts given different restoration scenarios. The final product would be a project management report that details specific actions, cost & potential benefits, time-line, and funding sources.

## **c. Rationale and significance to Regional Programs.**

### **Project Rationale**

The fundamental goal of this project is to provide a scientifically and economically valid strategy



for implementing projects and programs to protect and restore habitat and watershed processes in the Methow Valley in such a way that the communities will actively support and implement the recommendations and projects identified through past studies and this assessment. In order to accomplish this and meet related fish production goals of the FWP, the assessment must consider social and economic values and conflicts related to protecting habitats and watershed processes in an economically depressed area such as the Methow Valley.

The Methow has benefited from several large scale planning efforts in the last 5 or 6 years, (e.g. The Methow Valley Water Pilot Program, Ground Water Management Plan and the Multi-Objective River Corridor Plan, Methow Sub-basin plan in *Wy Kan Ush Mi Wa Kush Wit* ) that have produced some solid recommendations for conserving and protecting water resources in the Valley and managing flood hazards. However, very little implementation has occurred outside of the Methow Valley Irrigation District Project (MVID- BPA# 9603401). There are many reasons, only the more relevant ones are discussed.

1. Most of these plans have been single-objective and are not fully coordinated from a watershed process approach. Therefore, the relationships between resources, actions, ownership and outcomes are not clearly defined and do not generate widespread support from the community and government. Addressing one resource or issue such as water quantity or fisheries production does not consider problems of resource interaction or competition and can cause problems down the line for other resources and the local communities. A comprehensive watershed assessment and prioritization such as we are proposing is needed in order to identify and implement projects that will successfully protect the resources while maintaining community support and viability. Many of these plans call for protection and restoring riparian and fish habitat but, the basic map layers that identify these habitats do not exist and have not been compared to land-use and zoning layers or surface water and groundwater layers. It will be our goal to formulate some of these baseline data layers and integrate current recommendations with additional recommendations formed from a comprehensive watershed assessment.

2. Jurisdictional constraints have slowed implementation and coordination. Most of the recommendations requires a non-partisan local coordinating body such as a watershed council or watershed management forum recognized by local and regional government (Doppelt et al. 1993). Although it has taken several years, local organizations and citizens in the Methow have been working on forming this type of coordinating group. An interim Board and financial agent has been identified for the Methow Watershed Council and the Council is in the process of forming its work plan for 1998- 2001 and looking for funding for a watershed coordinator and program development.

#### Relationship to Regional and Local Plans

One element of PWI's mission is to link innovative science methodologies to management action. We are involved in developing watershed analysis and monitoring protocols used by Washington State, EPA, Tribes and the USFS. Innovative assessment components such as evaluating potential effects of shallow groundwater including irrigation return flow on temperature characteristics of thermal refugia and using a relationship of groundwater to landform as habitat indicators, should provide a solid scientific basis for identifying key areas and watershed processes for protection as well as establish links to watershed processes and land use impacts that contribute to degradation. Our scoping and action planning processes developed under an EPA grant will then help identify appropriate basin wide and project level actions to be coordinated and implemented by the Methow Watershed Council.

In addition, this assessment will address needs identified by the USFWS and the Tribal organizations in the Integrated System Plan for Salmon and Steelhead Production in the Columbia River Basin (1991) and the Methow Subbasin plan in *Wy Kan Ush Mi Wa Kush Wit* (1995). One common goal of the FWP and the USFWS is the protection of existing high quality habitat and reparation of restorable rearing habitat for juvenile salmonids.

#### *Needs identified to meet this goal include:*

- (1) Defining summer temperature profiles in tributaries and mainstem. PWI, the USFS and the Department of Ecology collect this type of data and this proposal could continue the program and synthesize the information into usable profiles to identify potential riparian, and water quality problems associated with temperature.
- (2) Inventory & evaluate all irrigation diversions.
- (3) Review and upgrade stream-typing
- (4) Investigate and implement side channel restoration and construction

- (5) Determine the status, distribution and habitat use of Steelhead, Bull Trout and cutthroat; Identify bull trout strongholds and fringe populations.

*Immediate Actions Identified to meet this goal include:*

- (1) Implement water conservation measures Identified in the Draft Methow Basin Plan that could help improve mainstem and tributary flows in fall and winter.
- (2) Identify and institute private landowner incentives to restore riparian vegetation.
- (3) Enforce Critical Areas Ordinance and Riparian Reserve designations that maintain large woody Debris (LWD) recruitment and retention through mapping of key areas and education of the landowners on the importance of these areas to fish, wildlife and property values.

This project is also related to regional programs that are concerned with the economic consequences of resource protection and restoration. The Pacific Watershed Institute (PWI), the Methow Valley Ranger District (MVRD) and the town of Twisp have been active in the Washington State Jobs for the Environment (JFE) and US Forest Service & US Fish Wildlife (USFWS) Jobs in the Woods (JITW) programs since 1996. These programs seek to create job and retraining opportunities to displaced workers in timber dependent rural communities. Watershed based restoration programs have been one mechanism for creating these new opportunities and bringing new sources of revenue to the communities. This proposal to assess and coordinate basin wide protection and restoration should continue to build these opportunities. Several new jobs will be created or supported by this proposal alone. The project plans generated from the proposal will also create new job opportunities for the future. Not only are jobs created, but the majority of grant funds are spent within the community on sub-contractors, goods and services. Currently, the Methow Basin is being proposed as a model watershed for the Jobs for the Environment Program. In addition, the United States Fish and Wildlife Service JITW program has chosen the Chewuch and Methow River basins as focus areas for 1998.

There is every indication that a continuation of this program through a comprehensive basin assessment will be supported by the above groups in a partnership effort. A strong partnership would create the long-term stability and commitment required to sustain monitoring and restoration work over the long road to watershed and fisheries recovery.

#### Relevance to Other Projects

This project also has relevance to several BPA projects occurring in the Methow Valley, The Methow Valley Irrigation District Conversion (MVID - Proj. No. 9603401 ), the Yakama Indian Nation (YIN) Wenatchee-Methow Coho Supplementation Program (Proj. No. 9603302 ) and YIN Methow Basin Side Channel Restoration (deferred - proj. No. 5509900). This assessment would build on the MVID goal to increase instream flows in the middle Methow and lower Twisp River. Because in-stream flow has been identified as one of the primary limiting factors for anadromous fish production, evaluating and prioritizing the numerous other irrigation systems, the largest water consumers, is extremely important. The Draft Methow Basin Plan ( 1994) looked at water use and economic costs of two other ditch systems in the Methow, but there are many more that need to be evaluated. PWI is already planning to evaluate options on the Early Winters Creek ditch system in 1998. The experience and information generated from the MVID project should be invaluable for future irrigation system issues. We may also be able to coordinate riparian area mitigation proposals that arise from the MVID project with proposals generated from the assessment project.

The success of the coho supplementation project will be somewhat tied to habitat restoration in the Methow. YIN is currently looking at acclimation sites in several tributaries. Identification, protection and restoration of spawning and rearing habitats near these areas will directly benefit released coho, returning adults and future naturally spawned juveniles. The assessment methods we have used in the Chewuch and Twisp Rivers are directly relevant to the side channel construction project. We have successfully identified and implemented side channel restoration in the Chewuch River over the last two years. Our key area list includes other side channels that have not been implemented and we are currently working on similar assessments in the Twisp River and tributaries to the Chewuch. The methods and/or results could be used by the YIN project. In addition, habitat, geomorphic and groundwater assessments planned in this proposal will be able to provide guidance on site selection and baseline monitoring for the side channel project.

#### Other Proposals and Arrangements

The Methow Valley Ranger District is applying for BPA99 funds in the hopes of completing a

variety of projects. Several of these projects will be conducted in collaboration with this proposal. The MVRD will be working on sub-watershed assessments, culvert and road inventory surveys on Federal Lands that will complement the same type of inventories needed for the larger Basin wide assessment. This project will help coordinate data acquisition and management on complementary projects on private and State lands in order to identify and prioritize projects for implementation and maintain consistency between methodologies.

The Methow Valley Citizens Council (MVCC) is serving as the interim fiscal agent for the Methow Watershed Council. The Council, once funded, can then provide some coordination for our proposal, work with the cooperator team, cooperate on community education and coordinate implementation of projects and programs identified in the comprehensive assessment. MVCC is looking for other funding for the Council besides BPA funding. If they are totally unsuccessful, our project coordinator can assume some of these responsibilities for the Valley in the interim.

A third proposal is being submitted by Dana Visalli to inventory non-anadromous species including amphibians and invertebrates. This inventory can serve as part of the baseline monitoring program and certain species may be useful indicators of habitat conditions for anadromous species. The sampling should be coordinated with existing and planned monitoring sites and key areas identified in previous watershed assessments.

Other cooperators on PWI's proposal include the Yakama Indian Nation, the USFS, interim Board members of the Methow Watershed Council and regional agency representatives. The Yakama's, Methow Watershed Council members and local agency staff have agreed to be on the cooperator team that will identify and prioritize resource needs and issues and assist in the development of implementable projects and actions. Department of Ecology has provided information on water quality issues in the Basin and is assisting on prioritization of sub-basins with water quality violations such as the Twisp River for temperature and instream flow. In addition, YIN has conducted smolt trap and redd surveys under an agreement with Public Utility Districts. The continuation of this program will fill one of the monitoring and evaluation needs of the project. They have also cooperated with us on snorkel survey training for fisheries crews, providing training and equipment.

Besides cooperating on tributary assessments, culvert and road inventory surveys and restoration implementation, the MVRD is working with PWI and the Arrowleaf resort to fund and manage an educational coordinator and interpretive signing for the Methow Basin. Several years ago, the MVRD began the Respect the River program to increase the public's awareness and understanding of watershed ecology. They publish unique and interesting "cartoons" of ecological ideas in the local paper and produce small plastic signs of these messages to post in campgrounds and dispersed recreation areas on federal lands. It has been a very effective program and received several regional awards. We hope the educational coordinator can expand the outlets for this program in the next few years to reach a larger audience and deal with additional subjects.

The approach that PWI has used in the Methow Basin has generated excitement and collaboration among agencies, private groups and citizens that were not working together before the restoration projects began. This is important because there has been much dissent and polarity on water issues in the Methow Valley. The projects have generated economic opportunities for local businesses and provided training and education for local displaced workers. Since, local equipment operators and others in the construction trades have been involved in the restoration activities, the projects have also given them a better appreciation for the issues and benefits of ecosystem protection and restoration. Volunteer groups and local land owners have become involved in the riparian and bank stabilization projects and have gained a better appreciation for how they impact the environment and learned about alternative, fish friendly methods for protecting their property.

Since one of the major goals of the Fish and Wildlife Program is to increase production, ensuring spawner success and juvenile survival is imperative. Protecting key habitats in streams through our restoration projects in Early Winters Creek and the Chewuch is critical for meeting this goal. Although, ongoing projects in the Chewuch and Early Winters Creek subbasins are securing local instream refugia, there is no assessment of basin-wide refugia to guide further protection and restoration project development. In order to keep the current momentum and atmosphere of cooperation, we need to complete this assessment and provide new project opportunities to keep the community and agencies involved.

#### **d. Project history**

Not Applicable

#### **e. Methods.**

*Objective 1 & 2. Methodology for evaluating existing information, identifying critical gaps, and establishing protection and restoration priorities*

Scoping Method. Scoping is proposed as the first essential phase of developing the Methow Basin integrated protection and restoration strategy for fish and wildlife. The scoping methodology was developed by PWI in 1991 for the Washington State Watershed Analysis (WFP, 1995). Subsequently, PWI has improved and expanded the process for use in the watershed assessment protocol for Tribal Nations (PWI, 1997). The process is based on accepted landscape and watershed analysis methodologies (e.g., McHarg 1969, Bovee 1982, Brooks et al 1990, Diaz and Apostle 1994).

The first step in scoping is to identify a team of cooperators. The cooperators are those parties with interest and knowledge of the watershed and are willing and able to participate. The second step provides background information to begin discussions on watershed issues and educate cooperators within the watershed on natural, historic and current landscape processes. The cooperators gather existing basin and subbasin assessments, data from site-specific studies, and other pertinent information. There are numerous sources of data available in the Methow Basin (e.g., ONF 1994, 1995a, 1995b, 1995c, 1996a, 1996b, 1997, Okanogan County 1996, Caldwell, B. and H. Beecher 1992, Groundwater Management Advisory Committee 1994, EMCON 1993, Golder & Associates 1991). The information is organized into matrix format and on base maps by type of information, spatial and temporal extent, limitations, source, methods, and level of uncertainty.

PWI will then synthesize the information with the assistance of the cooperator team. The objectives of this step are: (1) to increase understanding of the physical, biological, and social interactions in the basin; (2) to transfer this understanding into usable terms for choosing protection and restoration actions; (3) to identify resources, areas of concern, reference elements, issue categories, data, monitoring and analysis needs; and (4) encourage community involvement. This step of the process provides an opportunity for cooperators within the watershed to share their knowledge about the resources and air their concerns.

Overlay mapping techniques will be used to visually represent and organize ecosystem level information (McHarg 1969, Deschutes NF 1994, Olson and Bolton 1996, PWI 1997). Scoping will result in a series of rough draft maps, critical questions, and preliminary hypotheses regarding watershed conditions and processes, and the interactions between land-use activities, ecological processes and habitat conditions. A qualitative resource/habitat condition matrix will be used to initially rank areas for restoration and protection. This is similar to methods used in Instream Flow studies (Bovee 1982) and Habitat Evaluation Program (U.S. Fish and Wildlife Service 1980). Methods similar to the coarse screening process developed by Rhodes et al (1994) will be used in developing prioritization criteria.

A high level of uncertainty is anticipated from the priority ranking and initial assessment. Adaptive management techniques (Walters 1986, Walters and Holling 1990) will be used to address uncertainty, conflicting views, data gaps, and incorporate new information.

*Objective 3. Assessment Methods.*

For this assessment, we are using a modified version of the methodology developed for the Chewuch Restoration Strategy (PWI 1996). This method allows for relatively rapid assessment of large areas using sets of aerial photos in combination with landform layers and field data. An underlying premise of our assessment methodology is that landforms are a key controlling factor for channel morphology, riparian vegetation, and shallow groundwater flow. Landform maps are used to identify areas of the watershed that are conducive to forming and maintaining complex habitats, accumulating LWD, and supporting groundwater discharge. The components of the assessment are discussed in detail in PWI (1996) and (Smith 1993).

The Methow Basin has good photo coverage including aerial, infrared, thermal and oblique photographs. Aerial photographs are particularly effective for mapping the distribution landforms and other

controlling attributes. Historical reconstruction of channel movement is necessary to detect long-term adjustments or cyclic changes. We will use an aerial photo analysis method developed on several east side rivers to reconstruct the channel movement (Smith 1993, Wissmar et al. 1994; McIntosh et al. 1994, PWI 1996).

Winter low-flow, icing and extreme temperatures are important limiting factors for salmonid survival in the Methow. Initial photo reconnaissance indicates a loss of good winter habitats such as deep pools with cover and off channel areas. We will be assessing salmonid winter habitat availability and potential for restoring side-channel functions in collaboration with the Yakama Indian Nation BPA proposal for restoring Methow Valley Side-Channels. We assume the highest quality winter habitat will be associated with areas of groundwater discharge (Hillman et al. 1987, Morgan and Hinojosa 1996) because those areas will have higher water temperatures and not freeze.

A stratified assessment approach will be used to pick cost-effective candidates with the high potential for providing beneficial habitat conditions. The aerial photo analyses will be used to identify existing fluvial features that are likely candidates for winter habitat. The historical reconstruction of channel change data will be used to evaluate the potential longevity of candidates.

A second stratification will use the results of aerial photographic analysis with thermal data. We propose to use forward-looking infrared (FLIR) technology to assess stream temperature variability and groundwater discharge. FLIR technology has proved to be a highly portable and cost-effective method to collect very detailed data over large areas in very little time (McIntosh, per. comm. 10/97). The data can be structured to allow analysis at multiple scales--from the scale of habitat units to entire watersheds. The thermal data, in combination with landform and channel classification data, will be used to identify potential areas of thermal refugia, spawning, and winter habitat. For example, photos analysis and groundwater monitoring data from the Chewuch River indicated that groundwater discharge occurs at the downstream end of alluvial fans. After candidate sites are located on the aerial photographs, the sites will be evaluated in the field and unlikely sites will be eliminated. Reconnaissance field work will provide some evidence of groundwater occurrence. Indicators include vegetation, evidence of seeps and other groundwater emergence, water temperature measurements, and soil characteristics (Olson 1995). A subset will then be chosen for the baseline monitoring network.

*Objective 4: Establish baseline and effectiveness monitoring network.*

The critical assumption in our baseline and effectiveness monitoring strategy is that the success of any protection or restoration action requires monitoring pre- and post- action. On the short-term the baseline monitoring can be used to characterize conditions and for identifying and designing restoration strategies. Over the long-term the monitoring data will provide feedback on the success or failure of protection and restoration actions and watershed conditions as a whole. A second premise is that designing an appropriate and cost-effective monitoring network requires the development of a conceptual framework of the interactions within the system. The framework includes specific hypotheses and predictions about the watershed scale processes that can be measured and tested.

The habitat and instream monitoring protocol includes: channel cross-section profiles, vegetation and channel photo points, discharge (Q), water temperature, Hanken and Reeves (1988) habitat classification, four substrate composition indicators (V\*, pebble counts (Lisle and Hilton 1992), gravel bar dimensions and bed composition), an indicator (Edge Ratio, Smith 1993) of channel complexity and snorkel surveys of fish species abundance and diversity. Spawning habitat inventories will be conducted and data interpreted using the approach described in the TFW Ambient Monitoring documents (Schuett-Hames and Pleus 1996; Schuett-Hames et al 1996).

Groundwater seepage data will be monitored on sites selected through the winter habitat assessment. This will include measurement of seepage and subsurface flow and temperature patterns through the channel bed. The data will be used to evaluate the source and regime of the groundwater discharge. The methods used are discussed in detail in Olson (1995), Dingman (1994) and Lee and Cherry (1978).

Maintenance of monitoring network and continued coordination. Monitoring of watershed conditions and effectiveness of restoration or protection measures is a long-term commitment. The coordination of restoration and protection strategy would be transferred to a group such as the Methow Watershed Council (BPA99 Proposal Establish the Methow Watershed Council). The Council workplan includes forming a long-term citizen monitoring network. The Pacific Watershed Institute, in collaboration with other groups, would establish the monitoring protocols and offer training.

*Objective 5. Evaluation of restoration strategies, schedules and costs.*

The assessment methodology leads directly to implementable projects. The key areas are categorized as areas needing protection, areas needing restoration or areas that have enhancement potential. Factors affecting the condition of these areas, adjacent roads, inadequate culverts, soil erodibility and riparian condition, are listed and considered in prioritizing the sites for treatment.

The external and natural constraints that may influence implementation will be identified during this phase of the process. External constraints are those limitations that can be modified and include money, time, "will", water rights and other users. Natural constraints are climatic vagaries, extremes, climatic change and natural hazards. These generally cannot be changed. However, the potential effects of natural constraints on projects can be evaluated through developing scenarios and modeling. For example, on the Chewuch River we have monitored flooding impacts on restoration structures. This information will be used to determine appropriate designs. We have also evaluated the effects of low-flow conditions and droughts on side channel habitats through a combination of cross-section surveys, hydraulic and hydrologic modeling for different climatic scenarios. The restoration and protection strategies implemented on the Chewuch River provide a sound basis for estimating costs, habitat benefits, and timelines for other projects in the Methow Valley.

**f. Facilities and equipment.**

The Pacific Watershed Institute has maintained an office in the Methow Valley for the past two years to fully support the Methow Program. This office provides administrative and technical support to these projects only. In 1998, office space will be expanded to accommodate growth of the Methow Program. Additionally, the main office in Seattle provides budget, payroll and management support. The Seattle office also provides GIS support as needed. In addition, there are several local GIS organizations and system in the Methow Valley that can provide up to date GIS services. PWI owns most of the necessary equipment for carrying out project assessment, monitoring and management, including a Swoffer flow meter, and self-compensating levels, rods and tapes for surveying channel profiles. As the monitoring program grows PWI or the Methow Watershed Council may have to purchase additional flow meters and survey equipment. The Yakama Indian Nation provides and operates smolt traps and snorkeling gear on several Methow Tributaries to monitor smolt outmigration and species presence absence. We generally rent or lease hand held radios and additional computer equipment when needed. These costs would be part of the project budget as required. The groundwater monitoring portion of this proposal may require purchasing additional data loggers and PVC pipe for instrumentation of monitoring wells.

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## **Section 8. Relationships to other projects**

Relationships to Bonneville projects and other 1999 proposals were discussed in section 7c. So this section will cover other project relationships and partnerships.

Over the past year, partnerships and collaboration between PWI and MVRD has expanded by coordinating activities between different departments in the Forest Service such as recreation, engineering, and timber sale preparation. Through this broader collaboration new opportunities have opened up with other private landowners and agencies with interest in other high priority watersheds. Our Early Winters habitat restoration project planned for 1998 is a collaboration on instream, riparian, fish, wildlife, recreation access, community growth and education. Private landowners like Arrowleaf Resort will be assisting in project planning, partnership coordination and community outreach as well as providing cash matches. They have been instrumental in developing a relationship with the Early Winters Ditch Board, which will be critical to addressing limiting factors in Early Winters Creek and furthering the FWP goals to increase instream flow for anadromous and resident fish.

Other local community groups such as the Methow Valley Sports Trails Association, the Methow Conservancy and the Methow Institute Foundation are all willing to help out with this and future protection and restoration projects. We have applied for National Forest Foundation funds with these groups to fund an educational coordinator to develop interpretive signing and brochures for the Early Winters Creek and Methow Program.

Restoration projects such as those completed and planned in the Chewuch and Early Winters Creek have served as a catalyst to further collaboration in the Methow Valley. Furthermore, these partners have all recognized the need for a basin wide assessment and prioritization to guide their efforts to protect and restore the Methow Valley. Finally, most of the local representatives of the regulatory agencies responsible for project permitting have agreed to collaborate on a coordinated permitting process to reduce the workload and increase the efficiency of the process.

Other relevant efforts include the designation of the Chewuch River as a focus watershed by the United States Fish and Wildlife Service (USFWS) Jobs in the Woods restoration program (JITW). We

have developed a Chewuch working group to identify and implement additional projects to obliterate roads and culverts and restore overgrazed riparian habitat in high priority tributaries in 1998. In the future, USFWS may expand their focus to include projects throughout the Methow. The proposed comprehensive assessment is a perfect opportunity to develop appropriate projects for funding by the JITW program. In cooperation with the Methow Conservancy, PWI is working to link the acquisition of conservation easements with restoration on the mainstem Methow and in the Chewuch on private and State lands. Once the key habitat areas are identified by the comprehensive assessment, the Methow Watershed Council will collaborate with the local conservancy on identifying feasible opportunities for acquisition and donation of conservation easements, land parcels and development rights on parcels in these areas. In addition, PWI conducts baseline monitoring for the Methow Conservancy acquisitions. By overlapping our activities and sharing technical assistants, monitoring data can be collected in a standardized way.

We are also working with the MVRD, Arrowleaf, the MVSTA, the Methow Conservancy and the Methow Institute on environmental education and community outreach. We have applied for funding to hire an educational coordinator and continue a valley wide interpretive signing program. Four of the signs will be designed and installed around our Early Winters Creek project. As part of this program, local fisheries technicians are leading winter and summer aquatic ecology tours along the trail system. The tours will include explanation of the objectives and progress of the Early Winters Project in order to increase acceptance from the regional public and improve the effectiveness of current and future riparian and stream restoration efforts.

The Washington State Department of Fish and Wildlife (WDFW) owns and manages the Methow Valley Wildlife Refuge. Via State funding, the WDFW acquired numerous parcels of riparian and terrestrial lands to consolidate fish and wildlife habitat corridors in the Methow Basin. Many of these parcels have restoration needs, roads and culverts that are passage barriers, riparian habitat that has been overgrazed and irrigation withdrawals that are inefficient. PWI has collaborated with WDFW for the past two years on developing, funding and implementing restoration programs on some of these parcels to restore fish and wildlife habitat and prevent further degradation from cattle grazing leases. In 1998, we are planning culvert and road inventories, road obliteration, fencing and monitoring activities in several tributaries of the Chewuch River. Projects were chosen in Cub Creek in collaboration with the Methow where multiple landowners have agreed to donate conservation easements. Additional tributary inventories and restoration projects could be coordinated through the proposed project and the Methow Watershed Council. Restoring and protecting riparian areas through fencing, revegetation activities and easements reduces the affect of icing and harsh winter conditions on juvenile fishes by inhibiting the formation of anchor ice, encouraging free flowing areas in winter and shade in summer. Ongoing monitoring of the projects provides feedback to see if these activities are addressing limiting factors effectively.

## **Section 9. Key personnel**

PWI personnel have over 25 years of experience in developing methodologies, assessing watershed conditions and implementing monitoring protocols. The specific methods for this project have been successfully applied in the Methow Valley for the last three years. In addition, we will be hiring a project coordinator to oversee the cooperator team and coordinate project implementation with the Methow Watershed Council and other relevant projects. We will also be providing support for two full-time graduate students in hydrology and fisheries. Technical assessment components such as wildlife and terrestrial ecology will be subcontracted to local specialists. The crew supervisor, leader, and cooperating USFS fisheries technicians will be retained from past projects to conduct baseline monitoring and assist on other field inventories. They have been using the survey and habitat monitoring methods for the last 2-3 years. They are now proficient enough to assist in training any new displaced workers that will be hired on to the crew. This year the crew will receive additional data analysis training so they will be able to assist the technical staff with project layout and reporting. Two members of the crew are experienced at conducting the proposed culvert and road hazard inventories.

PWI Key Personnel:

Jeanette E. Smith, Project Manager, Aquatic Ecologist, & Group Facilitator - 75% FTE

Patricia L. Olson, Ph.D, Hydrologist & Scientific Advisor - 75% FTE

Resumes Attached.

## **Section 10. Information/technology transfer**

A USFS grant will be used to hire an educational coordinator. The educational coordinator will be designing interpretive signing, programs and brochures for distribution in the region. Presentations will also be given to the Watershed Council and the Methow Conservancy Forum on a regular basis. The Watershed Council is planning to develop a citizens monitoring network to carry out long term baseline and effectiveness monitoring Basin wide. PWI will be training the citizens in monitoring techniques and rational use of the measurements. Reports on the monitoring results will be prepared and publications will be submitted to peer reviewed journals and for presentation at professional meetings.

As part of PWI's mission we will make every effort to package these methods and approaches for distribution and use in other watersheds.